What is claimed is:

Claims

1. A method for supporting a semiconductor substrate having a first side and an opposing second side, comprising the operations of:

supporting the first side of the semiconductor substrate against a compliant surface;

aligning the second side of the semiconductor surface with a reference plane, the aligning causing a deformation of the compliant surface;

transforming the compliant surface to a rigid surface while the second side of the semiconductor substrate is aligned with the reference plane.

2. The method of claim 1, wherein the method operation of aligning the second side of the semiconductor surface with a reference plane includes,

applying a force to the second side of the semiconductor substrate.

3. The method of claim 2, further comprising:

utilizing a grinding wheel corresponding to the reference plane to apply the force against the second side of the semiconductor substrate.

4. The method of claim 1, wherein the method operation of transforming the compliant surface to a rigid surface while the second side of the semiconductor substrate is aligned with the reference plane includes,

applying an electromagnetic field to the compliant surface.

5. The method of claim 1, further comprising:

applying a vacuum to a portion of the first side of the semiconductor substrate to secure the semiconductor substrate against the rigid surface.

6. The method of claim 5, further comprising:

performing a processing operation of the second side; and

returning the rigid surface to a compliant state.

7. The method of claim 6, wherein the processing operation is a grinding operation.

8. A semiconductor substrate support, comprising:

a chuck configured to change between a compliant state and a rigid state; and

an electromagnetic field source configured to apply an electromagnetic field to the chuck, the electromagnetic field causing the chuck to change from the compliant state to the rigid state.

9. The support of claim 8, further comprising:

a channel extending through the chuck.

10. The support of claim 8, wherein the chuck further includes,

an outer membrane; and

a fluid defined within the outer membrane.

11. The support of claim 10, wherein the fluid is a magnetorheological fluid.

12. The support of claim 10, further comprising:

a semi-conductive polymer material disposed on an outer surface of the outer membrane.

13. The support of claim 12, wherein the semi-conductive polymer material acts as an electrostatic chuck.

14. The support of claim 9, wherein the channel is a vacuum channel.

15. A planarization module, comprising:

a rotatable semiconductor substrate support configured to support a substrate, the substrate support configured to alternate between a compliant state and a rigid state;

a rotatable planarizing surface disposed over the substrate support; and

an electromagnetic field source configured to apply an electromagnetic field proximate to the substrate support.

16. The planarization module of claim 15, further comprising:

a vacuum source configured to supply vacuum to a channel defined through the substrate support.

17. The planarization module of claim 15, wherein the substrate support includes,

an outer membrane having a fluid defined therein, the fluid configured to change viscosity in response to the electromagnetic field being applied to the substrate support.

18. The planarization module of claim 15, wherein the rotatable planarizing surface is a grinding wheel.

19. The planarization module of claim 15, wherein the rotatable planarizing surface is configured to orient the substrate in the substrate support while the substrate support is in the compliant state.

20. The planarization module of claim 17, wherein the fluid is a suspension that includes one of a magnetic and a magnetorheological material.

21. The planarization module of claim 15, wherein the substrate support includes,

an outer membrane having a polymer defined therein, the polymer configured to change compliance in response to the electromagnetic field being applied to the substrate support.

22. The planarization module of claim 21, wherein the polymer is a matrix that includes one of a magnetic and a magnetorheological material.